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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,924	01/20/2004	Eberhard Kempe	KEM/US/0306	2156

27774 7590 05/14/2007

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EXAMINER	
MUI, CHRISTINE T	

ART UNIT	PAPER NUMBER
1709	

MAIL DATE	DELIVERY MODE
05/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/761,924	KEMPE, EBERHARD	
	Examiner	Art Unit	
	Christine T. Mui	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :November 26, 2004; October 12, 2004.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5,979,219 to Sellmer-Wilsberg et al. (herein referred "Wilsberg") and USP 6,463,792 to

Kempe (herein referred "Kempe") in further view of USP 4,821,585 to Kempe (herein referred #585).

Regarding claim 1, the Wilsberg reference discloses a probe used for measuring volatile components in an aqueous solution with a continuous lumen and a membrane disposed transversely with respect to the lumen, which isolates the lumen from the outside, and a semiconductor sensor housed inside of the lumen at a distance from the membrane that forms a measuring chamber (see column 1, lines 6-14). The probe disclosed by Wilsberg teaches that the membrane of the probe forms a flat disk on the end of the probe body, which is taken to be the second measuring space, that extends transversely inside the probe that forms the measuring chamber, which the housing of the sensor delimits the measuring chamber on the side opposite of the membrane. The gases penetrate the membrane and then pass through the measuring chamber to arrive at the sensor by changing the resistance emitting a signal (see column 3, lines 13-22). The inlet bore in the probe of Wilsberg is interpreted to be the measuring aperture and the inlet opening is interpreted to be the first measuring space before the sensor (see column 5, lines 25 and 62-65). Kempe teaches that it is known in the art to construct a probe device able to measure a volatile component using a carrier gas (see column 5, lines 8-10). The reference #585, teaches that is known in the art to construct a probe device to determine the concentrations of volatile components in liquids or gases with a carrier gas traveling through a carrier guide canal covered by the permeation membrane, which is fed through a radial connection piece (see column 5, lines 10-12 and 52-55). The carrier-medium (carrier gas) feed canal is connected to the sensor via

a cross bore and a cross hole where the volatile component is measured at the sensor and where the carrier gas return is located behind the sensor to the rear end of the tubular part (see column 5, lines 62-64, column 6, lines 6-9 and lines 10-17). It is interpreted by the examiner that the area where the permeation membrane covers the carrier guide canal connected to the radial connection feed piece of the carrier gas is the second measuring space connected to the supply and the area where the cross bore and cross hole leading to the to the sensor and carrier gas return is interpreted as the first measuring space connected to the exhaust. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe device with a carrier gas in order to allow the volatile gas components to travel faster and permit shorter response times.

5. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585 as applied to claim 1 above and further in view of USP 6,852,223 to Huang (herein referred "Huang").

Regarding claim 2, the reference Wilsberg reference discloses a membrane against the construction of the probe in the form of a flat disk (see, column 3, lines 11-13). The membrane consists of at least two layers with different permeation resistances (see column 1, lines 52-53). The membranes used are known to be based on silicone and/or polytetrafluoroethylene, which have been successfully used for permeation of alcohols and in the Wilsberg invention multilayer membranes can be used (see column 2, lines 52-56). Huang teaches that is known to use a porous polytetrafluoroethylene membrane to separate a homogeneous mixture (see column 1, lines 49-53). It would

have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe device with the membrane made of a porous carrier layer in order to separate each component from a homogeneous liquid-liquid mixture.

As for claim 3, the Wilsberg reference discloses a multilayer membrane based on silicone and polytetrafluoroethylene to achieve higher separation efficiency. The selective layer is based on a silicon polymer such as polysiloxanes (see column 2, lines 52-56, 61-63). The Huang reference teaches that is known to use porous polytetrafluoroethylene membranes to separate a water alcohol solution (see column 1, lines 49-52). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe device with a multilayered membrane wherein the porous carrier layer is polytetrafluoroethylene and permeable layer is a silicon polymer in order to achieve a high separation of gases in a solution with a volatile component.

As for claim 4, the Wilsberg reference discloses the claimed invention except for the thickness of the silicone selective layer to be 10-20 μm (see column 2, lines 64-65). The second layer has a thickness in the range from 0.01 to 2.0 mm is disclosed. The silicone selective layer thickness is within the recommended range claimed. The Huang reference teaches that a porous polytetrafluoroethylene membrane is able to have a thickness from 10 to 300 μm (see column 6, line 21-30). The membrane thickness that Huang teaches is within the range claimed for the first layer. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to

construct the multilayer membranes with respective thicknesses in order to obtain a high penetration of volatile components into the carrier channel.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585 as applied to claim 1 above, and further in view of USP 5,331,845 to Bals (herein referred "Bals").

The Wilsberg reference discloses the claimed invention except for the volume of the measuring spaces. The Bals reference teaches a free volume, the volume portion of the chamber accessible to alcohol vapor is not to exceed about 1000μl and suggests a free volume range to be 50-500 μl (see, column 3, lines 32-34). The range is within the volume range claimed. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct a probe with a volume space to allow the flow of the volatile component in the first and second measuring spaces, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585.

The Wilsberg and Kempe references do not teach a specific size and volume of the measuring aperture claimed, but it would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the measuring aperture within workable ranges dependent on the size of the probe, since it has been held that where the general conditions of a claim are disclosed in the prior art,

discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585 as applied to claim 1 above, and further in view of Huang and USP 7,037,438 to Benzel (herein referred "Benzel").

As for claim 7, the Wilsberg reference discloses the claimed aspect of the invention, a membrane based on polytetrafluoroethylene that has been successfully used for the permeation of alcohols (see column 2, lines 52-56), except for the porosity of the membrane layers. The Huang reference teaches a porous polytetrafluoroethylene membrane with porosity in the range of 30 to 60% (see column 4, line 36-37). Benzel teaches that it is known to use a silicon membrane with a porosity of 30 to 40% (see column 4, line 66-67). The membranes of the references have the same pore space of the first and second layers. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the multilayer membranes with the same pore space of the flat membranes in order to allow the most efficient flow of volatile components into the measuring spaces.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585 as applied to claim 1 above, and further in view of Groboillot.

Wilsberg discloses the claimed invention except for the use of a carrier gas. Kempe discloses a probe device used to measure volatile component in an aqueous solution using a carrier gas. Groboillot teaches that it is known to use a carrier gas in a probe with a gas membrane sensor to transport solute molecules to measure volatiles

through a microporous hydrophobic membrane made of polytetrafluoroethylene at a flow rate of 30 cm^3/min. The flow rate is within the claimed range. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use a carrier gas to transport volatile molecules from the membrane to the probe sensor at carrier gas rate of 30 cm^3/min to transport the volatile molecules, as taught by Groboillot, since Groboillot states that on pages 1 and 3 that such a modification would carry the molecules from the membrane to the sensor at a faster rate to the sensor.

10. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe and #585 as applied to claim 1 above, and further in view of USP 4,404,284 to Heider et al (herein referred "Heider").

Regarding claim 9, the Wilsberg and Kempe references disclose the claimed invention except for having the probe comprising of three elements. The Heider reference teaches a probe body having three elements consisting of a probe core and two perforated tubes (an inner and outer tube) so that they are able to slide into the other and into the probe (see column 2, lines 59, 63, 65, column 3, line 6). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe device with three elements as suggested by Heider to minimize the number of piece and costs used to construct the probe.

As for claim 10, the Wilsberg and Kempe references disclose the claimed invention except for the seal member. Heider discloses a lock consisting of perforated tubes that slides into the other in a sealing manner is secured to the wall in a sealing manner by means of a flange (see column 2, lines 46-49). It would have been obvious

to one of ordinary skill in the art at the time of the invention was made to construct the probe device with at least one seal sealing member as suggested by Heider in order to delimit the liquid into the probe body risking contamination or ruining the sensor or device.

As for claim 11, the Wilsberg and Kempe references disclose the claimed invention except for the cylindrical probe body elements. Heider discloses the core of the probe is cylindrical and the inner and outer tubes are inherently cylindrical (see column 2, lines 64-65 and column 3, line 6). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe device with cylindrical probe body elements as suggested by Heider to optimize the shape of the probe using materials to fit the inner and outer tube of cylindrical shape to maximize the space inside of the probe device.

11. Claims 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe, #585 as applied to claim 9 and further in view of Heider.

As for claim 12 and 13, the Wilsberg references disclose a sealing ring adjacent to the end of the inner wall of the probe body (see column 5, line 66 to column 6, lines 1-2). At the inner wall of Wilsberg, the second measuring space is next to the wall of the probe. The sealing ring can have the characteristics of the ring element disclosed. Heider discloses a probe consisting of three elements. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the probe with a sealing ring adjacent to the front of the second element in order to create a

tight seal on the probe prevent an excess of liquids into the probe and tightly connect the probe elements together.

As for claim 15, the Wilsberg reference discloses the ring element adjacent the inside end wall of the probe body (see column 5, line 67 to column 6, line 1). Depending on the orientation that the probe is held, the ring element can be mounted on the second element if in the vertical position or abut to the second element if in the horizontal position. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to mount the ring element on the second element in order to seal the probe near the front of the probe to prevent erroneous liquids from flowing into the probe body where the carrier gas and sensor are located.

12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe, #585 and Heider as applied to claim 12 above.

The Wilsberg reference discloses the claimed invention except for stating that the ring element is an integral part of the second element. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the sealing ring (see column 5, line 66 to column 6, lines 1-2) as belonging as part of the entire probe, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works,* 150 U.S. 164 (1993).

13. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilsberg, Kempe, #585 and Heider as applied to claim 12 above, and further in view of USP 4,869,873 to Klein et al. (herein referred to "Klein").

Regarding claim 16 -18, the Wilsberg reference discloses the claimed invention except for the aspect of using radially oriented channels leading to a second measuring space. Klein teaches that it is known in the art to provide a plurality of diffusion channels or ducts arranged coaxially with and in the longitudinal direction of the entire casing that opens into the measuring space that permits a high throughput of gas (see column 5, lines 66-68 and column 6, line 23-25). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to construct the Wilsberg probe with channels to allow a high throughput of a gas with the coaxially oriented channels leading to the measuring space of Klein in order to increase the throughput of gas entering the probe. The coaxially oriented channels in Klein are oriented in the longitudinal direction of the tubular case having the characteristics of being radially oriented (see column 5, lines 65-68; column 6, lines 19-20). The high throughput of gas would allow the probe to have a higher response time of detecting volatile components in aqueous solutions. Klein teaches that the probe measuring volatile constituents in a liquid medium contains six channels or ducts that are coaxially oriented (see column 7, lines 6-16). It would have been obvious matter of design choice to construct the probe with only four channels, since applicant has not disclosed that four channels increase or decreases the supply and/or exhaust of the carrier gas over six channels solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with six channels for carrying the gas.

Claim Rejections - 35 USC § 112

14. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the examiner within the scope of the claimed subject matter whether the pore space is interpreted to be the exactly the same on the porous material and the first layer of the flat membrane or if it is interpreted to have a broader interpretation of the pore space is able to have the same pore space.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine T. Mui whose telephone number is (571) 270-3243. The examiner can normally be reached on Monday-Friday 7:30-5; Alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CTM

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